

Remarks

The Office Action dated March 11, 2005, has been received and carefully noted.

The following remarks are submitted as a full and complete response thereto.

Claims 1-9, 12-14 and 16-26 are pending in the present application and are respectfully submitted for reconsideration.

Claims 1-5, 7, 8, 9, 12 and 13 Rejected under 35 U.S.C. § 103

Claims 1-5, 7, 8, 9, 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tokuda et al. (U.S. Patent No. 5,134, 965, hereinafter "Tokuda") in view of Otsubo et al. (U.S. Patent No. 4,985,109, hereinafter "Otsubo"). Applicants respectfully traverse the rejection and submit that each of these claims recites subject matter that is neither disclosed nor suggested by the cited prior art.

Claim 1 recites a plasma processing apparatus comprising, among other features, wherein a distance D between the microwave radiating surface and a surface of the dielectric body facing away from the microwave radiating surface, which is represented with a wavelength of the microwave being a distance unit, is determined to be in a range satisfying an inequality of $0.7 \times n/4 \leq D \leq 1.3 \times n/4$ (n being a natural number), and whereby a standing wave of the microwave is formed between the microwave radiating surface and a plasma exciting surface, thereby exciting a plasma at the plasma exciting surface by being supplied with energy from the standing wave of the microwave, the plasma exciting surface substantially coinciding with the surface of the dielectric body facing away from the microwave radiating surface, the plasma being formed between the plasma exciting surface and the object to be processed, the standing wave not entering the plasma.

Claim 2 recites a plasma processing apparatus comprising, among other features, wherein a distance D between the microwave radiating surface and a surface of the dielectric body facing away from the microwave radiating surface, which is represented with a wavelength of the microwave being a distance unit, is determined to be in a range satisfying an inequality $0.7 \times n/4 \leq D \leq 1.3 \times n/4$ (n being a natural number), and whereby a standing wave of the microwave is formed between the microwave radiating surface and a plasma exciting surface, thereby exciting a plasma at the plasma exciting surface by being supplied with energy from the standing wave of the microwave, the plasma exciting surface substantially coinciding with the surface of the dielectric body facing away from the microwave radiating surface, the plasma being formed between the plasma exciting surface and the object to be processed, the standing wave not entering the plasma.

Claim 7 recites a plasma processing method comprising, among other features, the steps of determining a distance D between the microwave radiating surface and a surface of the dielectric body facing away from the microwave radiating surface, which is represented with a wavelength of the microwave being a distance unit, to be in a range satisfying an inequality $0.7 \times n/4 \leq D \leq 1.3 \times n/4$ (n being a natural number), and whereby a standing wave of the microwave is formed between the microwave radiating surface and a plasma exciting surface, thereby exciting a plasma at the plasma exciting surface by being supplied with energy from the standing wave of the microwave, the plasma exciting surface substantially coinciding with the surface of the dielectric body facing away from the microwave radiating surface, the plasma being formed between

the plasma exciting surface and the object to be processed, the standing wave not entering the plasma.

Claim 8 recites a plasma processing method comprising, among other features, the steps of determining a distance D between the microwave radiating surface and a surface of the dielectric body facing away from the microwave radiating surface, which is represented with a wavelength of the microwave being a distance unit, to be in a range satisfying an inequality $0.7 \times n/2 \leq D \leq 1.3 \times n/2$ (n being a natural number), and whereby a standing wave of the microwave is formed between the microwave radiating surface and a plasma exciting surface, thereby exciting a plasma at the plasma exciting surface by being supplied with energy from the standing wave of the microwave, the plasma exciting surface substantially coinciding with the surface of the dielectric body facing away from the microwave radiating surface, the plasma being formed between the plasma exciting surface and the object to be processed, the standing wave not entering the plasma.

It is respectfully submitted that the prior art fails to disclose or suggest at least the above-mentioned features of the Applicants' invention.

Tokuda merely discloses a plasma processing apparatus having a plasma chamber 6 housing an electrode 7 on which a substrate 8 is mountable, a cavity resonator chamber 20a provided above the plasma chamber 6 with a thick quartz plate 5 interposed therebetween, a slot plate 32 provided in close contact with the quartz plate 5, and another slot plate 34 provided above the slot plate 32. Furthermore, Tokuda discloses that a standing wave is formed within the cavity resonator chamber 20a, that the length t of the cavity resonator chamber 20a (distance between the slot

plates 32 and 34) is an integral multiple of the half of the guide wavelength or a value near the integral multiple thereof.

Otsubo is applied for allegedly showing a slot antenna where a part of the number of slots is closed.

Applicants submit that Tokuda in view of Otsubo fail to disclose or suggest each and every element recited in claims 1, 2, 7 and 8 of the present application. In particular, it is submitted that Tokuda fails to disclose at least that the plasma exciting surface substantially coincides with the surface of the dielectric body facing away from the microwave radiating surface. For instance, nowhere does Tokuda show or disclose the "plasma exciting surface" as recited in the present claimed invention.

In addition, Applicants submit that Tokuda fails to show at least "a standing wave of the microwave is formed between the microwave radiating surface and a plasma exciting surface" and "the standing wave is not entering the plasma." According to the Office Action, the Examiner characterized Tokuda as allegedly showing "forming a standing wave ..." and cited columns 13 and 14 to support the characterization. Applicants respectfully disagree with the Examiner's characterization since the disclosure of Tokuda does not show at least, for example, where the standing wave is formed.

Furthermore, It is submitted that Tokuda does not refer to the distance between a microwave radiating surface and a plasma exciting surface. The Examiner stated in the Office Action that the motivation for Tokuda to optimize the relative positions of the slot plate 34 and a quartz plate 5 is taught by Otsubo. However, Otsubo merely disclose a condition to ensure a space for microwave propagation. In contrast, the value ranges

stated in claims of the present application provide a condition to form a good standing wave between the microwave radiating surface and the plasma exciting surface. It is submitted that the condition to ensure a space for microwave propagation of Otsubo is neither comparable nor analogous to the condition as set forth in the presently claimed invention. Therefore, Applicants submit that Tokuda in view of Otsubo fail to disclose each and every element recited in claim 1, 2, 7 and 8 of the present application.

To establish *prima facie* obviousness, each feature of a rejected claim must be taught or suggested by the applied art of record. See M.P.E.P. §2143.03 and In re Royka, 490 F.2d 981 (CCPA 1974). As explained above, Tokuda in view of Otsubo, alone or in combination, do not teach or suggest each feature recited by claims 1, 2, 7 and 8. Accordingly, for the above provided reasons, Applicants respectfully submit that claims 1, 2, 7 and 8 are not rendered obvious under 35 U.S.C. § 103 by the teachings of Tokuda in view of Otsubo, and therefore claims 1, 2, 7 and 8 are allowable.

As claims 3, 5 and 9 depend from claim 1, claim 4 depends from claim 2, and claims 12 and 13 depend from claim 7, Applicants submit that each of these claims incorporates the patentable aspects therein, and are therefore allowable for at least the reasons set forth above with respect to the independent claims, as well as for the additional subject matter recited therein.

Under U.S. patent practice, the PTO has the burden under §103 to establish a *prima facie* case of obviousness. In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Both the case law of the Federal Circuit and the PTO itself have made clear that where a modification must be made to the prior art to reject or invalidate a claim under §103, there must be a showing of proper motivation to do so. The mere fact that a prior art

reference could arguably be modified to meet the claim is insufficient to establish obviousness. The PTO can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. Id. In order to establish obviousness, there must be a suggestion or motivation in the reference to do so. See also In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (prior art could not be turned upside down without motivation to do so); In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998); In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Lee, 277 F.3d 1338 (Fed. Cir. 2002). The Office Action restates the advantages of the present invention to justify the combination of references. There is, however, nothing in the applied references to evidence the desirability of these advantages in the disclosed structure.

Applicants respectfully request withdrawal of the rejection.

Claims 6 and 14 Rejected under 35 U.S.C. § 103

Claims 6 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tokuda in view of Otsubo in view of Tsuchihashi (U.S. Patent No. 6,109,208). Applicants respectfully traverse the rejection and submit that each of these claims recites subject matter that is neither disclosed nor suggested by the cited prior art.

As claim 6 depends from claim 1, and claim 14 depends from claim 7, Applicants submit that each of these claims incorporates the patentable aspects therein, and are therefore allowable for at least the reasons set forth above with respect to the independent claims, as well as for the additional subject matter recited therein.

Claims 16-26 Rejected under 35 U.S.C. § 103

Claims 16-26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tokuda in view of Otsubo et al. (U.S. Patent No. 4,985,109). Applicants respectfully traverse the rejection and submit that each of these claims recites subject matter that is neither disclosed nor suggested by the cited prior art for at least the reasons stated above with respect to claims 1-9 and 12-14.

Conclusion

In view of the above, Applicants respectfully submit that each of claims 1-9, 12-14 and 16-26 recites subject matter that is neither disclosed nor suggested in the cited prior art. Applicants also submit that the subject matter is more than sufficient to render the claims non-obvious to a person of ordinary skill in the art, and therefore respectfully request that claims 1-9, 12-14 and 16-26 be found allowable and that this application be passed to issue.

If for any reason, the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper has not been timely filed, the Applicants respectfully petition for an appropriate extension of time.

Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 107176-00007.**

Respectfully submitted,



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Enclosure: Petition for Extension of Time (1 month)